

GESTURE CONTROLLED PATIENT ASSISTANCE SYSTEM

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Abstract- The purpose of the Scheme is to have an economical, dependable scheme to provide effective communication for paralytic patients and nurses. A motion detector, generally an accelerometer will be attached to any movable part of the body of the patient. A patient can direct information effectively to the medical attendant by changing the direction of the movement sensor. The tilt angle will be directed to the controller to which the sensor is being connected. Based on different tilt angles it will send different information through a wireless channel from a patient (transmitter) to a nurse (receiver). Each individual will have such devices mounted on their body and all the devices will be connected to the common point of the receiver at the nurse side. Alongside this there will be an RTC module connected with the system at the nurse side as a treatment notice and a beeper will simplify the work. The venture gives a helpful, dependable, and huge answer for elementary issues viewed by medical attendants while offering help to handicapped patients.

Keywords – accelerometer; arduino; gesture controlled; patient assisatant;RF module;wireless;cost effective.

I. INTRODUCTION

Amongst the enormous amount of headways ended in the clinical area, not many focus on assisting patients with handicaps to impart. In spite of the fact that checking frameworks brand it simpler for specialists to gather and notice a patients vitals, there aren't numerous choices for sincere vocal correspondence for incapacitated patients. The basic yet compelling approach is proposed to take care of this deep- rooted issue .The primary intention is to supplant the ordinary methodology of patients-nurture correspondence with current advances that give a lot quicker and dependable approach to do as such. In the current situation, the patient's must be subject to a relative or generally award kid the two of which need to take care of the patient continually. Our goal is to make such patients free to speak with the medical caretaker by the basic assignment of inclining a gadget situated on his or her finger or some other piece of the body that is fit for development. This won't just assistance the patient yet additionally back out the attendant's work. As a solitary attendant is answerable for some patients, the period required for all medical care taker to visit each patient to address the issues will be protected. Once the patient states the message the medical attendant can distantly screen their solicitations and help immediately. A ringer situated at the attendant's work area will caution the medical caretaker if there should be an occurrence of a crisis. To make the framework more unique and unequivocal a constant medication update is actualized to help the attendant in her every day schedule by giving time and medication to every patient. Every one of these thoughts together subsequently center around building a savvy framework to make patients independent and help the medical caretakers simultaneously time.

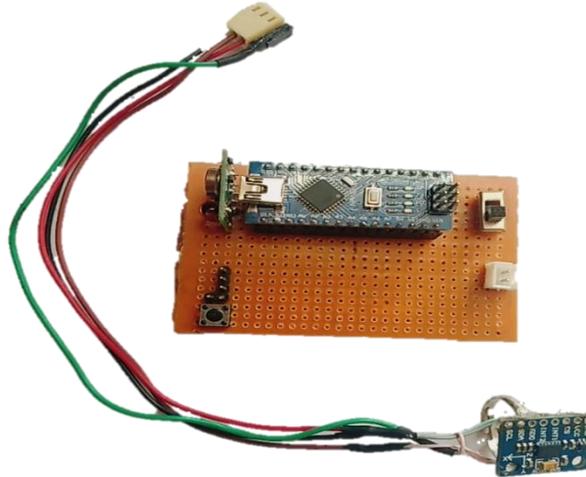


Figure 1. The patient side system

II. RELATED WORK

The Monitor is electrically associated with the Power and Control Section which house the logic and power transmission parts. This division gives three outlets that permit up to twelve distinct devices. [1]

The strictly impaired patients cannot work even with the actuator, for such patients signals are used to control or to direct information. [2]

Hand gestures are used to control the wheelchair instead of the conventional method. The distress call system is used to alert the concerned people during an emergency. [3]

A signal acknowledgment is finished with the assistance of a sensor glove which comprises five accelerometer sensors. The signal is perceived by contrasting the speeding up qualities and the put-away layouts. As per the perceived signal, particular orders are played through the speaker utilizing the voice chip. [4]

III. PROPOSED METHODOLOGY

To overcome all the above disadvantages and meet the necessities of the framework, a framework is proposed that basically contains a transmitter and a beneficiary region. In the transmitter fragment (at the patient side), a two-turn accelerometer will be put on the finger of the patient. This accelerometer is good for assessing the static speeding up on account of gravity and thusly finding the edge at which the contraption is inclined with respect to the earth. At whatever point open minded requirements any help, he inclines the accelerometer differently. This goes probably as a commitment to the accelerometer while the yield of it is in volts that are related with the regulator board which goes probably as the getting ready unit. The yield of the accelerometer depends upon the tilt edges and is examined by the regulator. The regulator maps the data voltages someplace in the scope of 0 - 5 volts into number characteristics someplace in the scope of 0 - 1023 as straightforward data from the extent of 0-1023. This reach gives a massive load of affectability and a slight move can incite change in regard. To diminish the unusualness and give a fundamental course to the patients, we decreased its affectability by planning it to 0-5 volts and thereafter gave a reach to front, back, forward and the opposite. These headings can be helpfully appreciated and used by any individual using his/her thumb or any bit of the body fit for moving in these manners. A predefined message considering the fundamental necessities of the patients and those needed for an emergency will be taken care of in the degrees apportioned to a particular heading as referred to already. For example, sustenance or water is the message demonstrated when the patient moves his finger aside. Thusly, on inclining the accelerometer aside, it will send information to motivator and the regulator.

The accelerometer will be related to each patient and will have a regulator board and transmitter for sending the message. For conspicuous evidence of different patients, their name or number is distributed off the orderly. Every one of these transmitters can be associated midway to one RF recipient which takes a shot at a similar recurrence as

the transmitter. In this way, the proposed system will give a numerous to one correspondence. At the recipient side, RF collector will get the message and send it to the controller board on the beneficiary side which will at that point show the message on the LCD. On gathering of the message, medical attendant will remotely make the necessary move to take into account the requirements of the message. If there should arise an occurrence of crisis the patient needs to simply press a press button which will flag the handling board to send a crisis caution to the recipient. The beneficiary will at that point signal the controller to initiate the ringer. This will assist the medical caretaker with taking consideration of the crisis at the earliest opportunity. Taking solution at the ideal time is a certifiable business, the Medicine Reminder is another segment of this device to incite the chaperon an opportunity to give patients their medications. The Medicine Reminder is proposed to be used by the chaperon or watchman so a slip up is never made in giving the medications. The medicine update is executed using a constant clock.[4] Usually for ongoing DS1307 Real-time clock chip close by a battery is used, yet this grows the proportion of gear used and makes the device huge. Thusly, we propose a framework wherein the timetable of the impressive number of patients will be taken care of in the information base and the clinical guardian will be reminded therefore when it's an ideal opportunity to go to any patient as demonstrated when table. This will be executed by programming the regulator board. On interfacing the LCD with the regulator and empowering the code in the item, the constant clock runs the time on the grandstand. In addition, we can set an alarm time for the solution schedule of a get-together of patients. Right when a particular alarm turns on, the introduction exhibits Patient1 solution, Patient2 medicine, and so on The framework proposed will be client characterized so the chaperon can change the schedule as shown by the necessities as and when the patient changes.

IV. COMPONENTS REQUIRED

A. Arduino Nano: Arduino Nano is a little, viable, adaptable, cordial Microcontroller board, created by Arduino. cc in Italy, in view of ATmega328p (Arduino Nano V3.x)/Atmega168 (Arduino Nano V3.x). It accompanies similar effectiveness as in Arduino UNO. It has a working voltage of 5V, the information voltage can shift from 7 to 12V. Arduino Nano Pinout contains 14 computerized pins, 8 simple, 2 Reset, and 6 Power Pins. Every one of these Digital and Analog Pin is doled out with different capacities however their fundamental capacity is to be designed as info or yield. Capacities like pin Mode() and digital Write() are utilized to control the activities of computerized pins while analog Read() is utilized to control simple pins. The simple pins accompany a complete goal of 10 bits which measures the incentive from 0 to 5V. Arduino Nano accompanies a gem oscillator of recurrence 16MHz The constraint in Arduino Nano is not having a power jack, which implies you can't supply an outside force source through a battery. The board doesn't utilize standard USB for association with a PC, it accompanies Mini USB uphold. Little size and breadboard amicable nature settle on this gadget an ideal decision for a large portion of the applications where the size of the electronic parts is of extraordinary concern. Streak memory is 16KB or 32KB that all relies upon the Atmega board for example Atmega168 accompanies 16KB of glimmer memory while Atmega328 accompanies a blaze memory of 32KB. Streak memory is utilized for putting away code. The 2KB of memory out of absolute blaze memory is utilized for a boot loader. The SRAM can change from 1KB or 2KB and EEPROM is 512 bytes or 1KB for Atmega168 and Atmega328 separately. This board is very like other Arduino sheets accessible on the lookout, yet the little size makes this board stand apart from others. It is customized utilizing Arduino IDE which is an Integrated Development Environment that runs both disconnected and on the web. No such plans are needed to run the board. All you require is a board, a small USB link, and Arduino IDE programming introduced on the PC. USB link is utilized to move the program from the PC to the board.



Figure 2. Arduino Nano

B. Accelerometer (ADXL345) - The ADXL345 is a low-power, 3-axis MEMS accelerometer modules with I2C and SPI interfaces. The Adafruit Breakout boards for these modules feature on-board 3.3v voltage regulation and level shifting which makes them simple to interface with 5v microcontrollers such as the Arduino. The ADXL345 features sensitivity ranges from +/- 2G to +/- 16G. Which supports output data rates ranging from 10Hz to 3200Hz. The sensor consists of a micro-machined structure on a silicon wafer.. Deflection causes a change in capacitance between fixed plates and plates attached to the suspended structure. This change in capacitance on each axis is converted to an output voltage proportional to the acceleration on that axis.

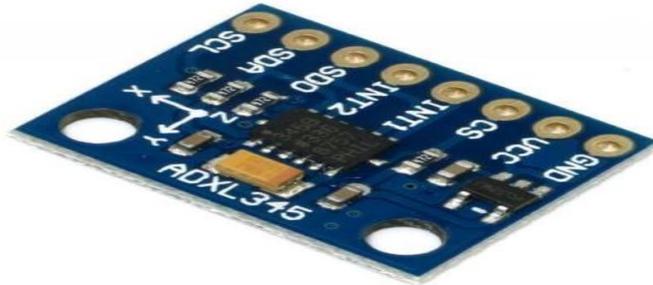


Figure 3. ADXL345 Accelerometer

C. RF Module (Transmitter and Receiver) - The RF module, as the name proposes, works at Radio Frequency. The relating recurrence goes to changes between 30 kHz and 300 GHz. Right now, the computerized information is spoken to as varieties in the abundance of bearer waves. This sort of balance is known as Amplitude Shift Keying (ASK). Transmission through RF is superior to IR (infrared) as a result of numerous reasons. Initially, flags through RF can go through bigger separations making it appropriate for long-range applications. Additionally, while IR for the most part works in view mode, RF signs can travel in any event, when there is a hindrance between transmitter and beneficiary. Next, RF transmission is more grounded and more solid than IR transmission. RF correspondence utilizes a particular recurrence dissimilar to IR signals which are influenced by other IR radiating sources. This RF module contains an RF Transmitter and an RF Receiver. The transmitter/recipient (Tx/Rx) pair works at a recurrence of 434 MHz A RF transmitter gets sequential information and transmits it remotely through RF through its radio wire associated at pin4. The transmission happens at the pace of 1Kbps – 10Kbps. The transmitted information is gotten by a RF beneficiary working at a similar recurrence as that of the transmitter.

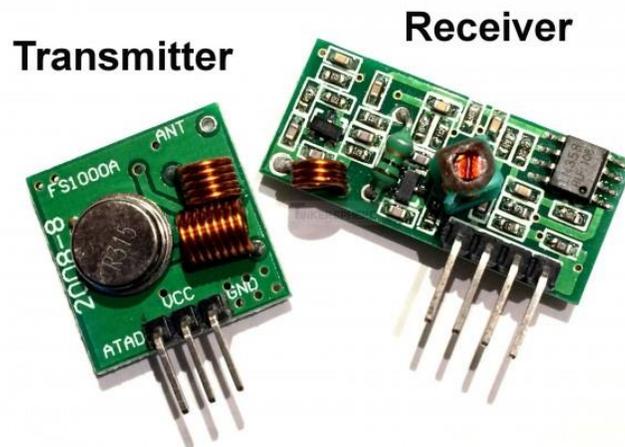


Figure 4. RF Module

D. Arduino UNO - Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can

tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. Arduino Uno is a microcontroller board dependent on the ATmega328P (datasheet) has 14 advanced information/yield pins (of which 6 can be utilized as PWM yields), 6 simple data sources, a 16 MHz quartz gem, a USB association, a force jack, an ICSP header, and a reset button. It contains all that expected to help the microcontroller; basically, associate it to a PC with a USB link or force it with an AC-to-DC connector or battery to begin. You can dabble with your UNO without agonizing a lot over accomplishing something incorrectly, the most direct outcome imaginable you can swap the chip for a couple of dollars and begin once more. "Uno" signifies one in Italian and was picked to check the arrival of Arduino Software (IDE) 1.0. The Uno board is the first in a progression of USB Arduino sheets and the reference model for the Arduino stage; for a broad rundown of current, past, or obsolete sheets see the Arduino file of sheets. The ATmega328 on the Arduino Uno comes prearranged with a boot loader that permits you to transfer new code to it without the utilization of an outer equipment developer. It imparts utilizing the first STK500 convention.



Figure 5. Arduino UNO

E. Liquid Crystal Display - A liquid crystal display (LCD) is a level board show or another electronically balanced optical gadget that utilizes the light-regulating properties of fluid gems. Fluid gems don't transmit light straight forwardly, rather utilizing a backdrop illumination or reflector to create pictures in shading or monochrome. LCDs are accessible to show self-assertive pictures (as in a universally useful PC show) or fixed pictures with uninformed substance, which can be shown or covered up, for example, preset words, digits, and seven-portion shows, as in an advanced clock. They utilize a similar fundamental innovation, then again, actually self-assertive pictures are comprised of countless little pixels, while different presentations have bigger components. LCDs are utilized in a wide scope of utilizations including LCD TVs, PC screens, instrument boards, airplane cockpit shows, and indoor and outside signage. Little LCD screens are normal inconvenient shopper gadgets, for example, computerized cameras, watches, mini-computers, and cell phones, including cell phones. LCD screens are additionally utilized on customer hardware items, for example, DVD players, computer game gadgets, and timekeepers. LCD screens have supplanted substantial, massive cathode beam tube (CRT) shows in practically all applications. LCD screens are accessible in a more extensive scope of screen sizes than CRT and plasma shows, with LCD screens accessible in sizes going from little advanced watches to exceptionally huge TV inputs. Since LCD screens don't utilize phosphors, they once in a while endure picture copy in when a static picture is shown on a screen for quite a while, e.g., the table edge for a carrier flight plan on an indoor sign. LCDs are, nonetheless, helpless to picture constancy. The LCD screen is more energy-effective and can be discarded more securely than a CRT can. Its low electrical force utilization empowers it to be utilized in battery-controlled electronic hardware more effectively than CRTs can be. By 2008, yearly deals of TVs with LCD screens surpassed deals of CRT units around the world, and the CRT got out of date for most purposes.

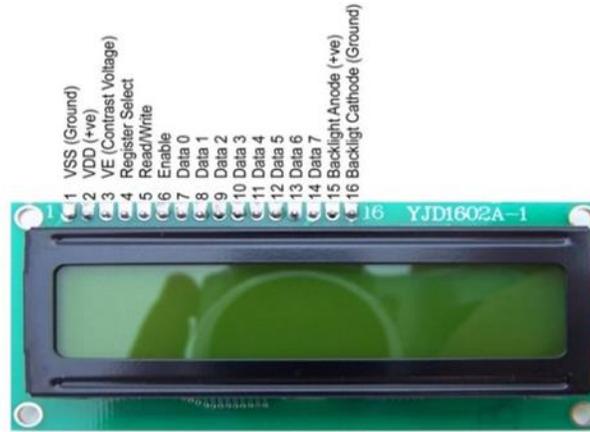


Figure 6. 16x2 LCD Module

V. BLOCK DIAGRAM

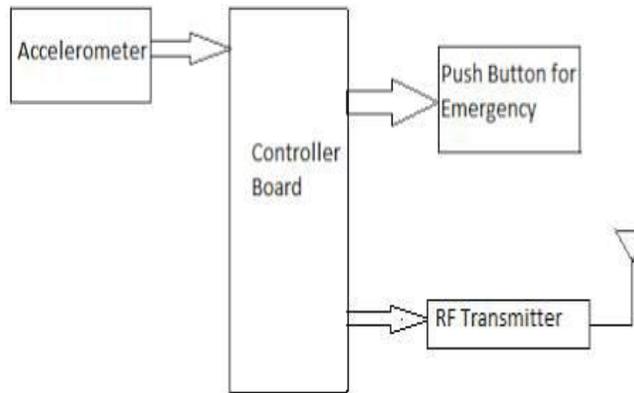


Figure 7. Transmitter Part

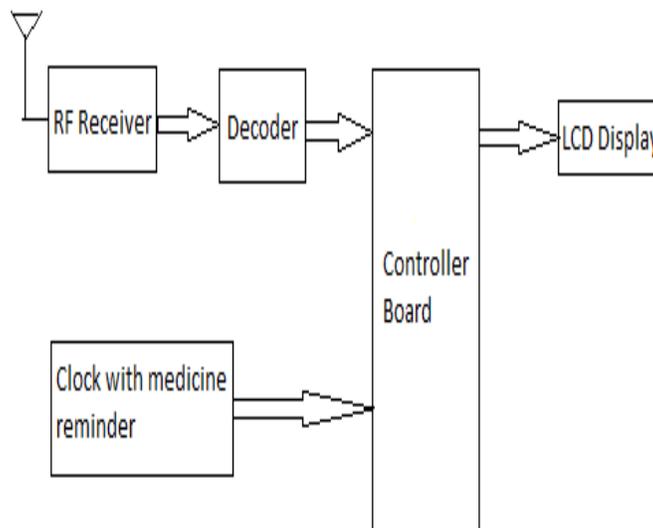


Figure 8. Receiver Part

VI. DESCRIPTION OF WORKING

a. Transmitter block: According to the proposed technique, going with the square framework to meet the necessities of the structure. The focal point of the transmitter unit is the accelerometer. Which is a two-turn or a three-focus point static accelerometer with the fundamental responsibilities of the controller, interfaced with the controller to perceive the quickening. The controller is the part of the transmitter which shapes the information from the accelerometer and if the conditions are fulfilled it acknowledge the transmitter. We have proposed and executed an RF transmitter for its straightforwardness. Another obligation to the controller is from the press button which is utilized for crises.

b. Receiver block: The RF authority gets the messages and ships them off the controller. The message is to show up on the LCD which is interfaced to the controller. The restriction of the controller is to get to the predictable and set alerts for patients with the remedy name. This should be possible in two particular habits: one course is to utilize a consistent module, and the subsequent path is to do it utilizing a program plan. There will be a ringer, if the press button for an emergency is crushed, by then the transmitter will bestow a sign which will sanction the bell through the regulator to search for the thought of the available clinical guardian to go to the particular patient who has squeezed the crisis button.

VII. SIMULATION RESULTS

The simulation results inform about the messages received at different time intervals from the patients on the receiver part of Arduino IDE. The figure illustrates the usage of Real-Time Clock (RTC) and the messages acknowledged from the patients. RTC synchronizes with drug reminder. The simulation window shows four different messages sent by patient 1 and patient 2. This window will be accessible at the recipient site which is on the orderly side. Right, when no sign is sent simply a continuous clock will be appeared on the screen. At the point when a message as a result of the development of the accelerometer is received, it will appear on the screen. Unmistakable verification of the message from different patients is made basic as the patient number is sent close by the message. The drug update program will show its yield at a predefined set-aside time.

```

11:12:00
11:12:01
11:12:02
patient1:Emergency
11:12:04
11:12:05
11:12:06
11:12:07
11:12:08
patient2:food/water
11:12:10
patient1:washroom
patient1:Needs help
11:12:13
11:12:14
patient2:Emergency
11:12:16
11:12:17
11:12:18
patient1:food/water
11:12:20
patient2:washroom
11:12:22
patient2:Needs help
11:12:24
11:12:25
11:12:26
patient 1 medicine time
11:12:28
11:12:29

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Autoscroll No line ending 9600 baud

Figure 9. Usage of Real time clock and messages received from the patient at the recipient site

VIII. CONCLUSION

This work presents the movement of message feasible just by the movement of a body part. The straightforwardness of message development is the essential cycle of elbowroom of this framework close by the continuous client characterized remedy alert. By realizing this framework, a fundamental gadget for debilitated or crippled people can be cultivated without the usage of complex sort of wellsprings of data. The model we have made is totally utilitarian anyway kept to a little territory. For an enormous zone and transmission division, the sort of correspondence used should be progressively feasible and speedier. Our framework viably shows that this framework is an incredible method to actualize it in an emergency clinic and nursing homes for the good patient to nurture correspondence. The endeavor can be also shaped into a modified wheel seat the wheelchair will be moved just by hand movement. Similarly, close by message transmission, other data like inside warmth level, the beat rate can moreover be sent to the clinical orderly so an ongoing record of patients is kept up.

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